Space Weather Forecast

Issued on Sunday, 08 May 2022 at 01:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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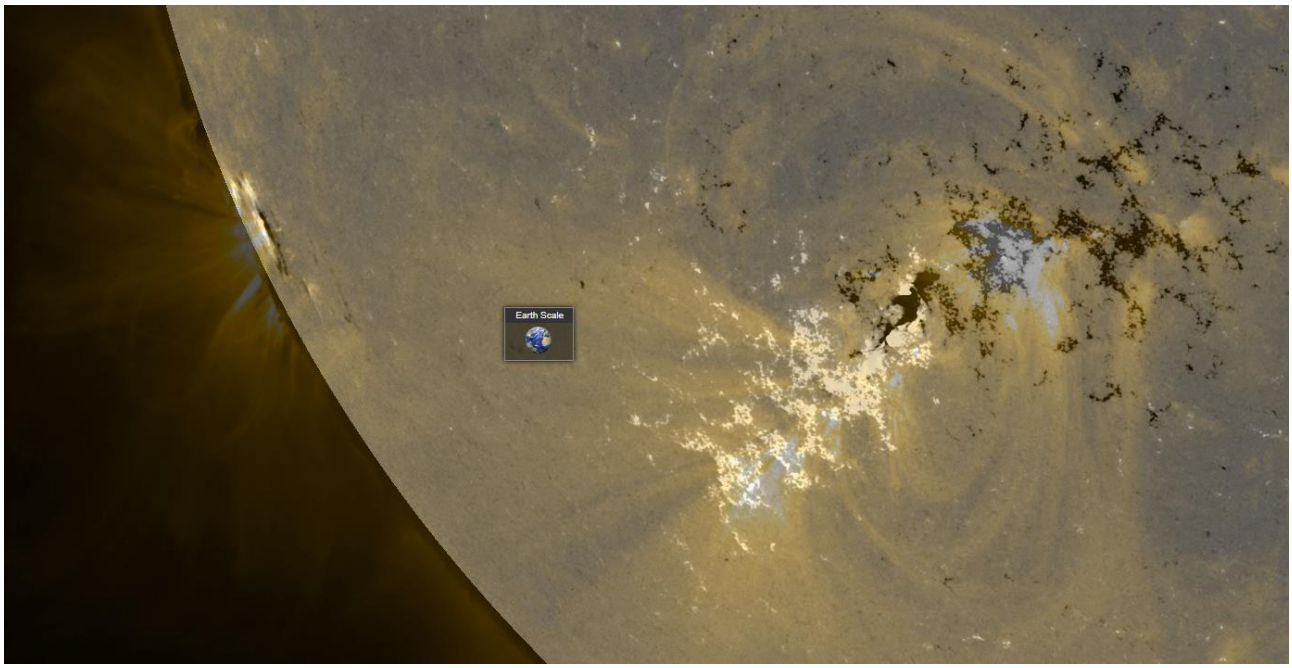
Space Weather Forecast Headline: Minor geomagnetic storms possible to start and end four days. Decreased risk of radio blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low through the UTC day of Saturday 07 May, with isolated common-class X-ray flares recorded at GOES16. The largest of these flares came from a sunspot in the southeast at 07/0605UTC, but also of note was a smaller common class event at 07/1507UTC from a new region on the southeastern solar horizon. This second group has probably yet to show its full hand and may have been responsible for a far-sided Coronal Mass Ejection (CME) shortly before its arrival on the Earth-facing side, so perhaps remains a region to monitor.

Figure 1: False-colour composite image from 07/2200UTC of magnetic polarities and extreme UV, showing the most active sunspot group (black and white region on right) and an emerging new region near the eastern solar horizon (centre left). These groups were responsible for the largest flares of the past 24 hours.



There are currently up to five sunspot regions on the sun, although there has been a definite settling in activity as the two largest and most active regions have matured over the past 36 hours. All other regions on the disc were unremarkable, unipolar and stable.

There remain a large number of 'filaments' (arcs of plasma) on the sun at present. One of these

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was seen to disappear around 07/1900UTC. This event has yet to manifest in satellite imagery but is awaited. In addition, shortly before the start of this 24-hour reporting period, a 'filament lift-off' occurred in the northeastern part of the sun (around 06/1900UTC). This was seen in subsequent satellite imagery and has been analysed with a possible Earth-bound component, perhaps due late on 10 May. No other CMEs were in evidence in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind followed a slow regime in the period, with the speed within normal background levels. The number of particles comprising the wind and their magnetic field were both unremarkable, and resulting geomagnetic activity was quiet throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: A quietening trend in the most active sunspot groups should mean activity should be mostly low, but with a daily Chance of moderate-class flares and a Slight Chance of strong. This risk should reduce slightly with the passing of one of the largest spots onto the far side by midweek UTC.

Solar Wind / Geomagnetic Activity: No significant fast solar winds feature in this forecast.

Up to two CMEs are possible in the period, firstly a low confidence arrival from 03/1700UTC due within day one, Sunday 07 May, although this feature is now later than anticipated with a reduction in the risk of G1 therefore suggested. After a lull on Monday, there is then a period of more likely minor storm G1 intervals from a second CME, spawned by a disappearing filament on 06/1900UTC. This risk should peak shortly after the most likely arrival time of 10/1500UTC, probably then continuing into day four before abating.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a daily slight chance of S1 largely as a result of the largest sunspot's westward advance towards a better-connecting part of the sun (should any large X-ray flare and subsequent proton event be produced).

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	30	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	25	10	10
Very Active	R3 to R5 X	No	5	5	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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